OPERA 6

DYNAMIC PROGRAMMABLE SYNTHESIZER

DK 600

SCHEMATIC DIAGRAM

SIEL®

CABLE MAP

DISPLAY

S G

ADSR

DCO

P

brown
blue
black

P N

green

yellow
white
red
brown

brown
violet
red

white
grey
yellow

grey
green
violet

E R F

S

R

P

red
brown
grey
green
brown
white
orange
yellow
brown
violet
red
black
red
orange
yellow
violet
brown
violet
red

blue

FUSE

red
blue
blue

blue

green

green

VOICES

N

M

I

D M P

POWER
SUPPLY

TRANSFORMER

green
black
black

red
white
red

C

L

C D E F G H

L

M

black
red
yellow
orange
violet
brown
green
grey

B

A

CPU

red
yellow
brown
orange
violet

red
violet
green
yellow
blue

H

KEYBOARD

POWER SUPPLY 440 99 4016

front view

+15 TP-1 D1-D8 1N4001

C1 2200µ 35V

V rel

+5 TP 2

-5 TP 3

-15 TP 4

transformer code 37299044
at 220V 392 99 045

fuse 1A AT

KBPC 802
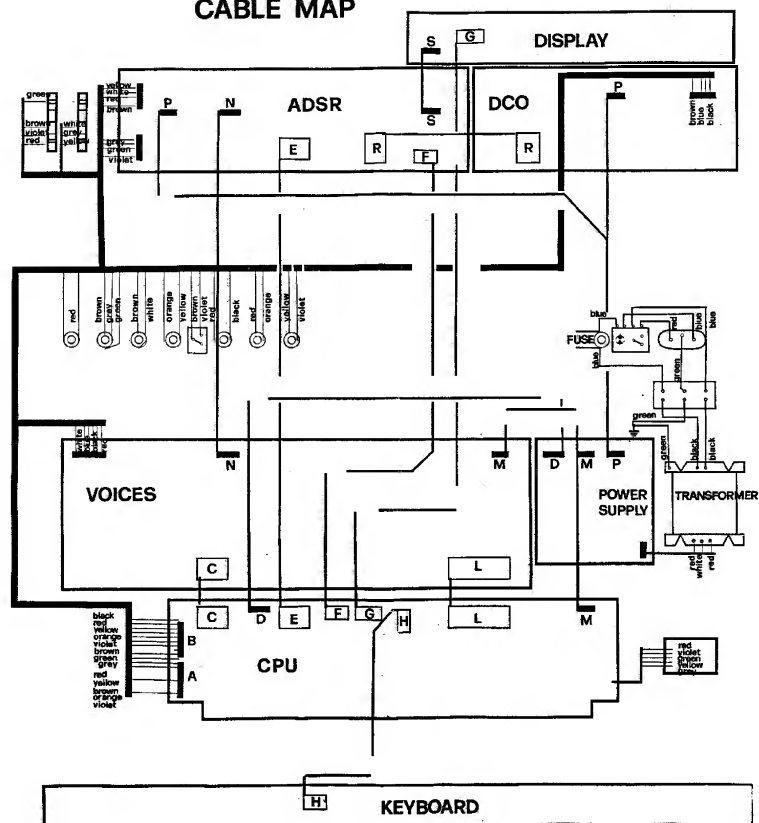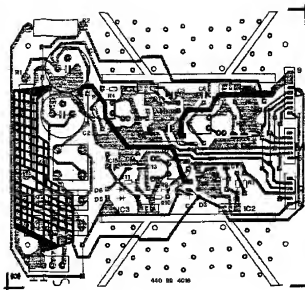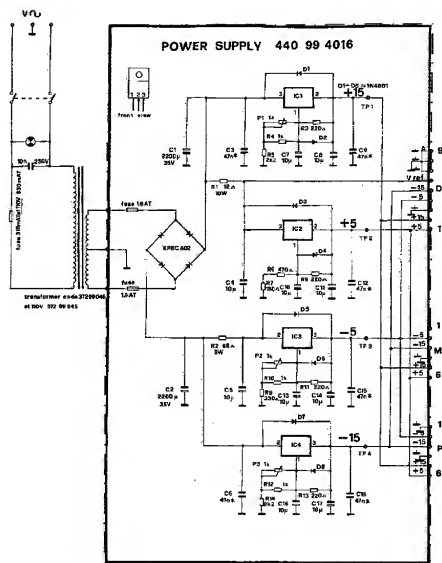
POWER SUPPLY		
I C 1-2	LM 317	367.99.8006
I C 3-4	LM 337	367.99.8005

KEYBOARD		
I C 1	74LS154	367.99.6503

KEYBOARD 440 99 4017

440 99 4016

C LOW   C HIGH

PB0 PB PA0 PA2 PA4 PA6 PB3 PA5 PA7 PA3 PA1 PB2
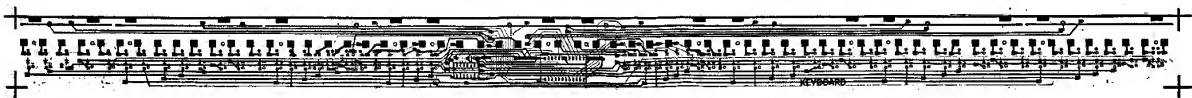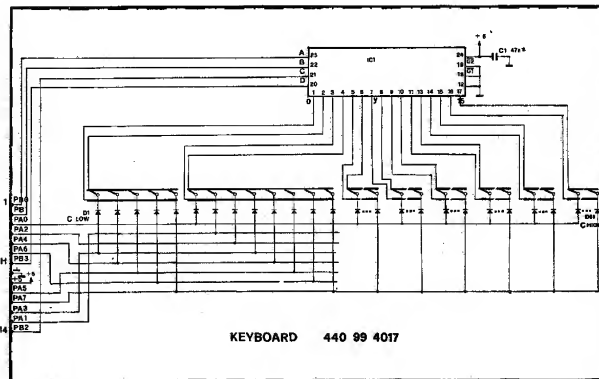
KEYBOARD

1 DISPLAY BOARD ASSY 590 05 0045
590 05 0050

2 D.C.O. BOARD(LEFT) ASSY 590 05 0047

3 ADSR BOARD (RIGHT) ASSY 590 05 0048

4 VOICES ASSY 590 06 0056

5 POWER SUPPLY ASSY 590 02 0017
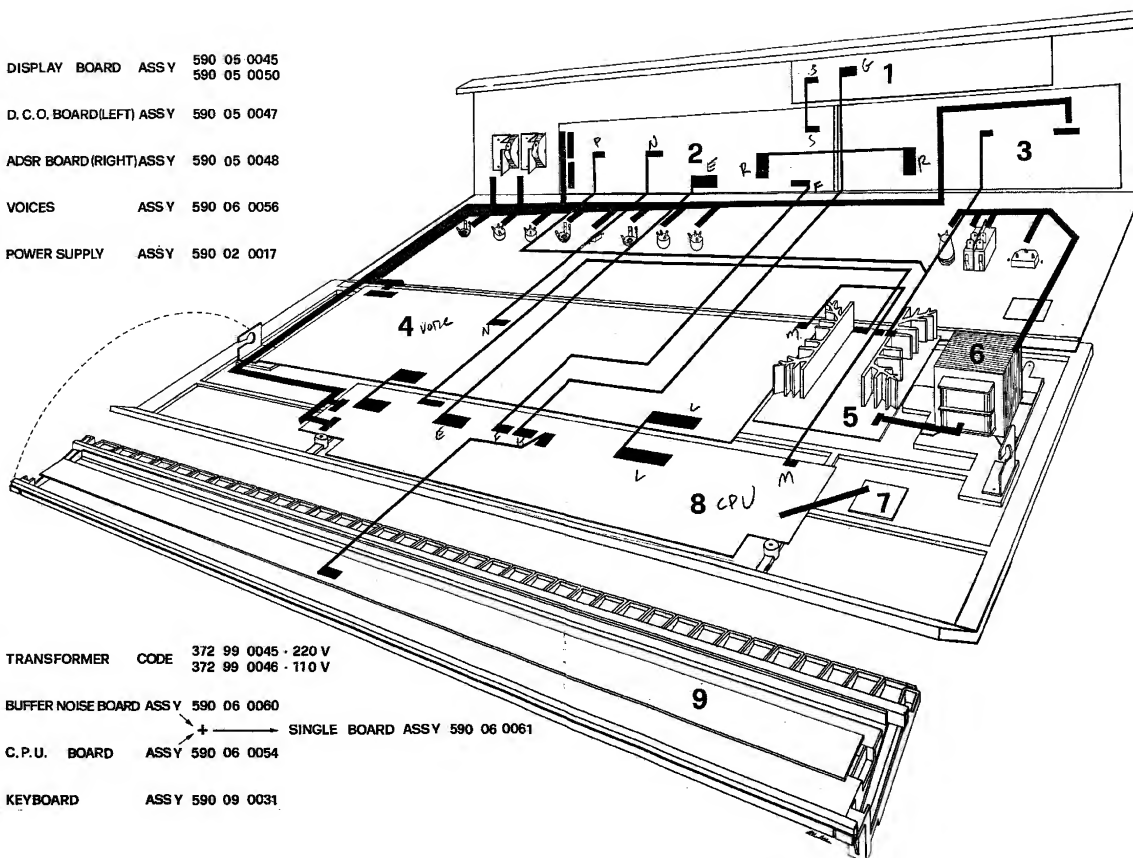
6 TRANSFORMER CODE 372 99 0045 - 220 V
372 99 0046 - 110 V

7 BUFFER NOISE BOARD ASSY 590 06 0060

+ ⟶ SINGLE BOARD ASSY 590 06 0061

8 C.P.U. BOARD ASSY 590 06 0054

9 KEYBOARD ASSY 590 09 0031

BACK PANEL ASSEMBLY

OUT

OUT

PEDALS

B1
+5   B3
VCF

+5   FPA
VCA

TAPE

FROM
B6
B7

ON–OFF
B4   B5

TO
B8
B9

MIDI

A9   A4
IN

A8   A1
OUT

MIDI SECTION

D0 D7

C116 12 8 10 4
47n

CS0 CS1 TXCK RXCK

CK OUT MIDI

R 147
4 k 7

22
21
20
19
18
17
16
15

TX 6

IC 38

CS2 9   EN MIDI

RX 2

3   4
IC 40

5   6
IC 40

R 139 220 Ω   A8

A8   A1

R 148 220 Ω   A1

A9

OUT

R 140
270

8

IC 39   3

6   2

D 28

R 141
220 Ω   A4

A7

A0 11 RS
A1 13 R/W

R 142
4 k 7

IRQ 7   INT3

13
IC 40   12

11
IC 40   10

R 144
4 k 7

R 146
220 Ω   A6

A3

A9   A4

IN

DCD CTS E
1 23 24

14

R 143
4 k 7

8
IC 40   9

EN.

R 145
220 Ω   A2

A5

NOTE

Interconnect cables should not exceed fifty feet (15 meters), and must have a corresponding 5-pin DIN male plug (SWITCHCRAFT 05GM5M or equivalent.) The cable should be shielded twisted pair, with the shield connected to pin 2 at both ends. Notice that while the MIDI OUT jack is grounded to the instrument chassis, MIDI IN is not. This allows the cables to provide their shielding services without creating ground loops.

ADJUSTMENT

ADJUSTMENT SEQUENCE

1. Power Supply Trim
2. HFO A Tuning
3. Waveforms Gen. Amplitude Adjustment
4. VCA Gain Adjustment
5. HFO B Tuning
6. ADSR Time Adjustment
7. VCF Offset Adjustment

All adjustments must be made after the instrument's power has been on for at least five minutes.

POWER SUPPLY TRIM

1) Switch on the instrument.
2) Set DVM to TP1 (.4016) and adjust P1 to read +15.000 V
3) Set DVM to TP2 (.4016) and read +5V 25%.
4) Set DVM to TP3 (.4016) and adjust P2 to read -5.000 V.
5) Set DVM to TP4 (.4016) and adjust P3 to read - 15.000 V.

Note: the supply must be fully loaded.

HFO A TUNING (.5009)

1) Press FREE, introduce saw-tooth A (L.E.D.   WAVES), set CUTOFF to the max. and RESONANCE to the min.
2) Set MASTER TUNE to the center.
3) Press the second 'A'(from the right) and adjust P1 to obtain a 440 Hz frequency (use a diapason).

WAVEFORMS GEN. AMPLITUDE ADJUSTMENT (.5011)

1) Press FREE.
2) Connect oscilloscope to TP9.
3) Introduce saw-tooth A.
4) Press the second 'E' (from the right) and set the saw-tooth amplitude to +4.800 Vpp operating trimmer P3.
5) Press the first 'E' (from the left - three octaves lower than the former) and set amplitude to +4.800 Vpp operating trimmer P4.
6) Verify that the saw-tooth amplitude is +4.800 Vpp on the whole keyboard extension.
7) Connect oscilloscope to TP5.
8) Repeat point 4) operating P1.
9) Repeat point 5) operating P2.
10) Repeat point 6).
11) This adjustment is to be made for the 6 voices.

Adjustment Control

1) Connect oscilloscope to TP24.
2) Recall program 93.
3) Verify that the 6 voices' PW's are at 50%.

VCF CUTOFF AND RESONANCE ADJUSTMENT (.5011)

1) Recall program 91.
2) Connect oscilloscope to TP24.
3) Press any key and set the sine amplitude (any frequency), to 400 mVpp operating P5 of the voice indicated by the lit L.E.D.
4) Repeat point 3) for the 6 voices.
5) Set P8 to the center.
6) Connect freq.m. to TP24.
7) Press any key and set the sine frequency to 880 Hz operating P7 of the voice indicated by the lit L.E.D.
8) Repeat point 7 for the 6 voices.

ADSR TIME ADJUSTMENT (.5011)

1) Recall program 92.
2) Connect oscilloscope to pin 10 (IC 1) or to R7 of voice 1.
3) Press any key and set attack time to 5.800 seconds operating P10 of the voice indicated by the lit L.E.D.
4) Repeat point 3) for the 6 voices.

VCA GAIN ADJUSTMENT (.5011)

1) Press FREE.
2) Introduce saw-tooth A.
3) Set CUTOFF to the max.
4) Set RESONANCE to the min.
5) Connect oscilloscope to TP24.
6) Press middle 'C' and adjust P9 of the voice indicated by the lit L.E.D. to obtain a saw-tooth amplitude equal to 400 mVpp.

HFO B ADJUSTMENT (.5009)

1) Recall program 90.
2) Press any key and adjust P3 so as to eliminate the beat between HFO A and HFO B.

VCF OFFSET ADJUSTMENT (.5011)

1) Press FREE.
2) Set VCF CUTOFF to 3/4.
3) Set VCF RESONANCE to the min.
4) Connect DMM to TP24.
5) Without depressing any key, read voltage on DMM; e.g.:-1.34 mV.
6) Press any key and adjust P6 of the voice indicated by· the lit L.E.D. so as to read the same voltage as per point 5) on the DMM.
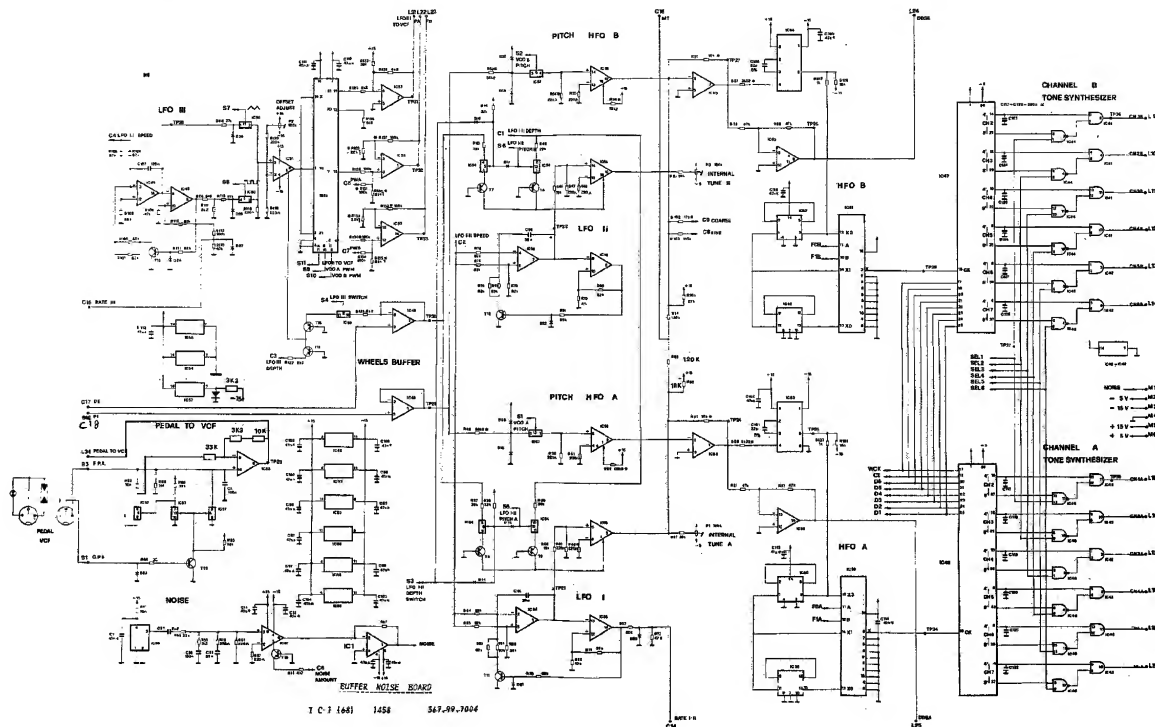7) Repeat point 6)for the 6 voices.

NOTES

- R*   IMPLIES SPECIAL RESISTOR
- C*   IMPLIES CERAMIC CAPACITOR
- ALL PNP TRANSISTORS ARE BC 560 part code 364.99.0004
- ALL NPN TRANSISTORS ARE BC 239 part code 364.99.0005
- ALL DIODES ARE 1N4148
- ALL RESISTORS ARE 1/4 WATT
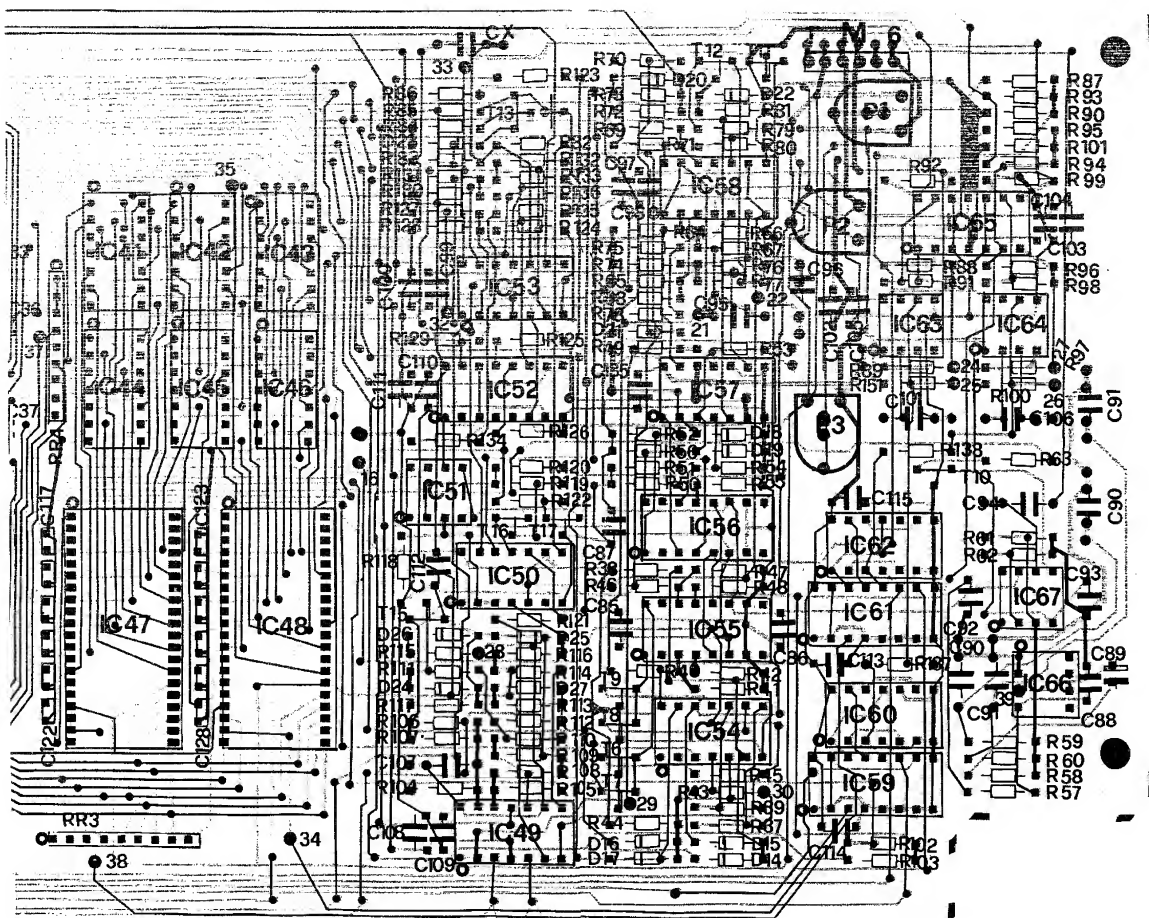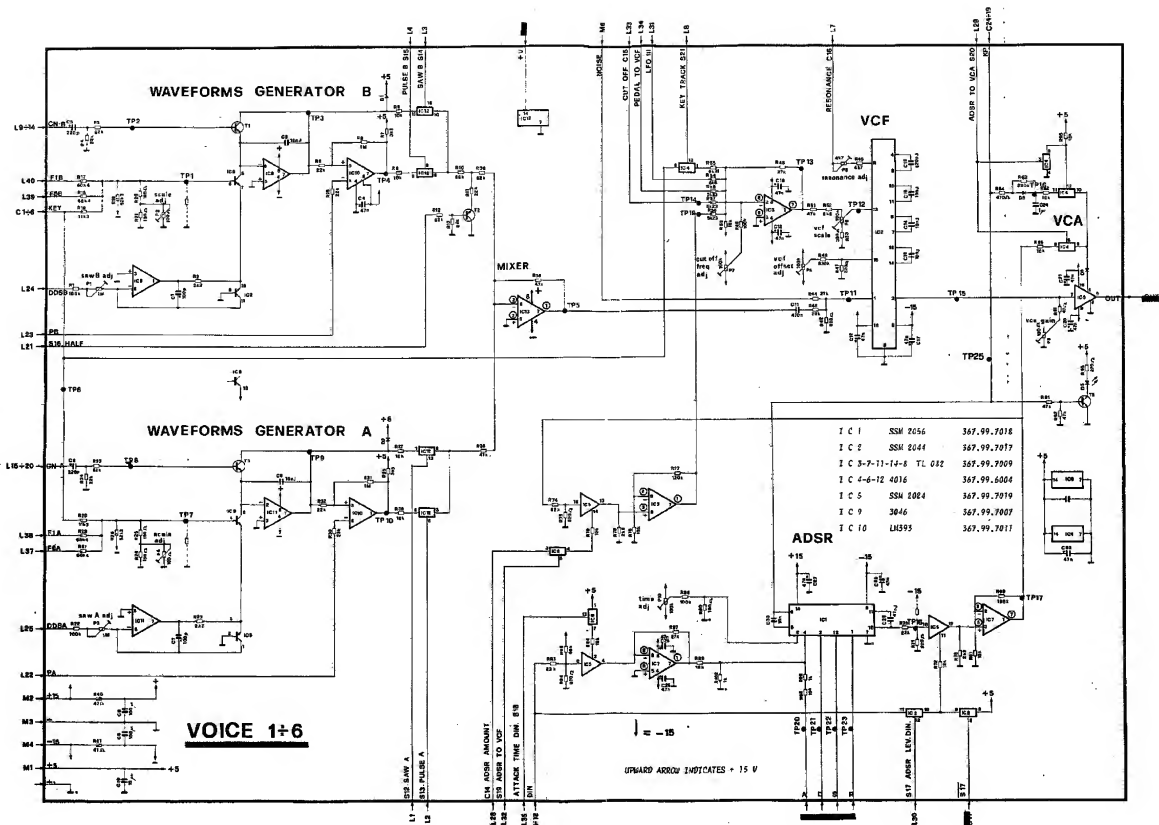- ALL ELECTROLYTIC CAPACITORS ARE 16 V DC UNLESS OTHERWISE INDICATED.

Schematic diagram — VOICE 1÷6

WAVEFORMS GENERATOR B

WAVEFORMS GENERATOR A

MIXER

VCF

VCA

ADSR

I C 1	SSM 2056	367.99.7018
I C 2	SSM 2044	367.99.7017
I C 3-7-11-14-8	TL 082	367.99.7009
I C 4-6-12	4016	367.99.6004
I C 5	SSM 2024	367.99.7019
I C 9	3046	367.99.7007
I C 10	LM393	367.99.7011

UPWARD ARROW INDICATES + 15 V

VOICE 6 VOICE 5 VOICE 4 VOICE 3 VOICE 2 VOICE 1

VOICE 1 VOICE 2 VOICE 3 VOICE 4 VOICE 5 VOICE 6

MIXER

MASTER VOLUME

OUTPUT

PEDAL JACK

VOICES BOARD 440.98.5011

LEFT CONTROL PANEL BOARD
440 99 4014

RIGHT CONTROL PANEL BOARD
440 99 4015
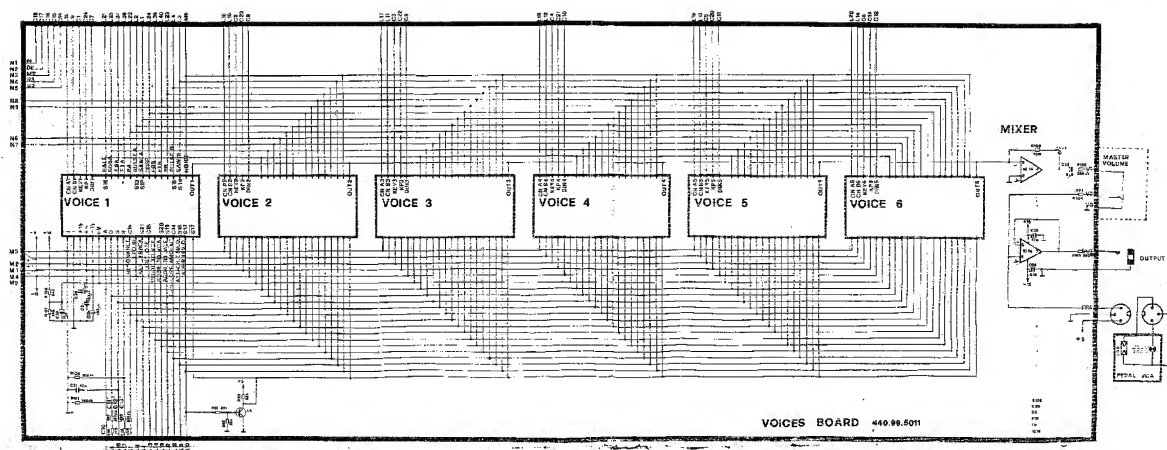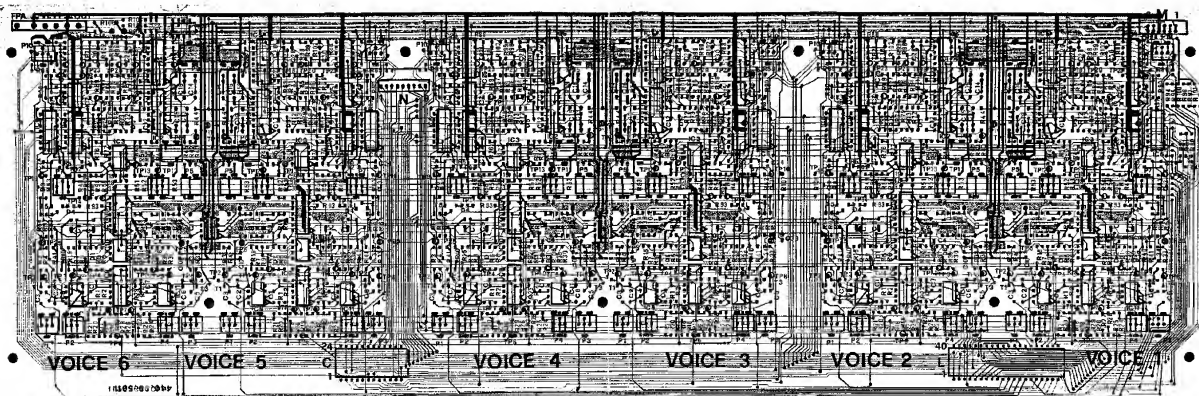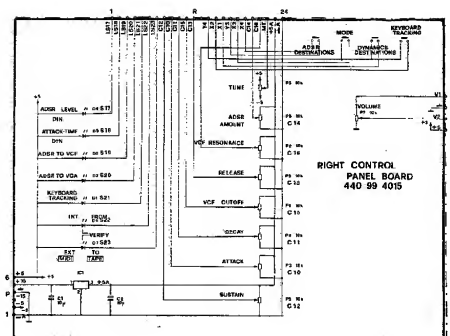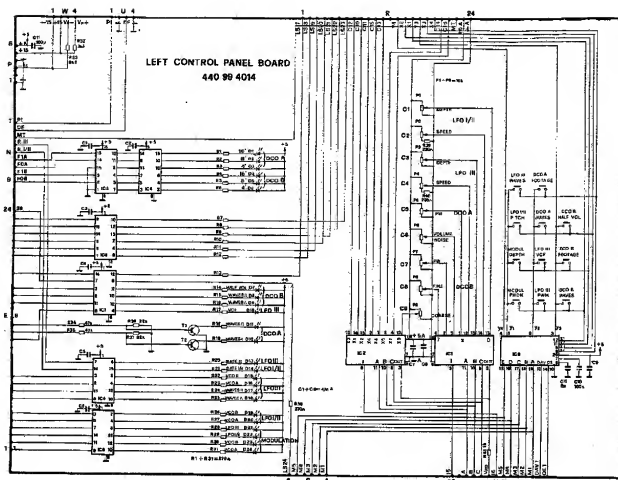
LEFT CONTROL PANEL D.C.O.		
I C 1-2	4051	367.99.6013
I C 3	4555	367.99.6036
I C 4-8	4049	367.99.6012
I C 9	74C923	367.99.6035

RIGHT CONTROL PANEL A.D.S.R.		
I C 1	7805	367.99.8009

LEFT

RIGHT
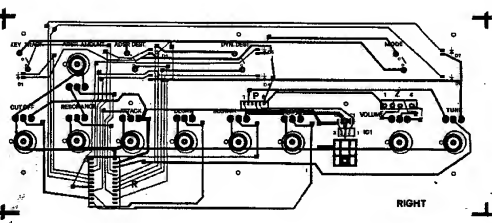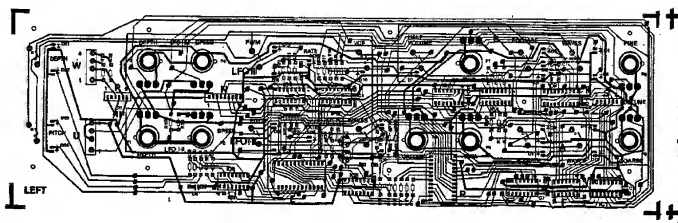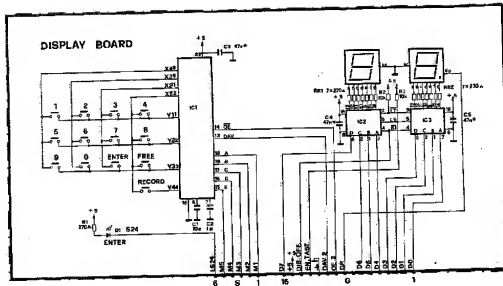
DISPLAY BOARD

DISPLAY BOARD		
IC 1	74C923	567.99.6035
IC 2-3	4511	567.99.6027
DISPLAY	MAN 4140	567.99.9001
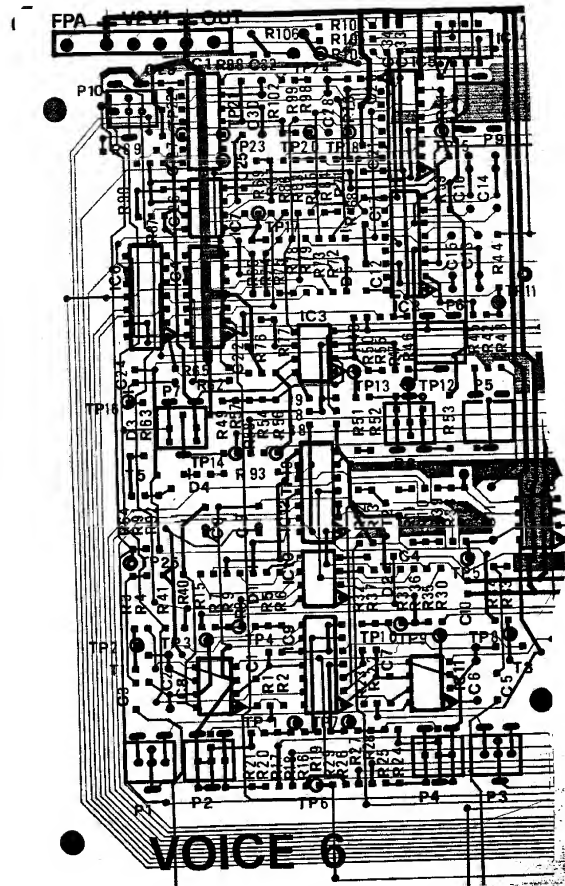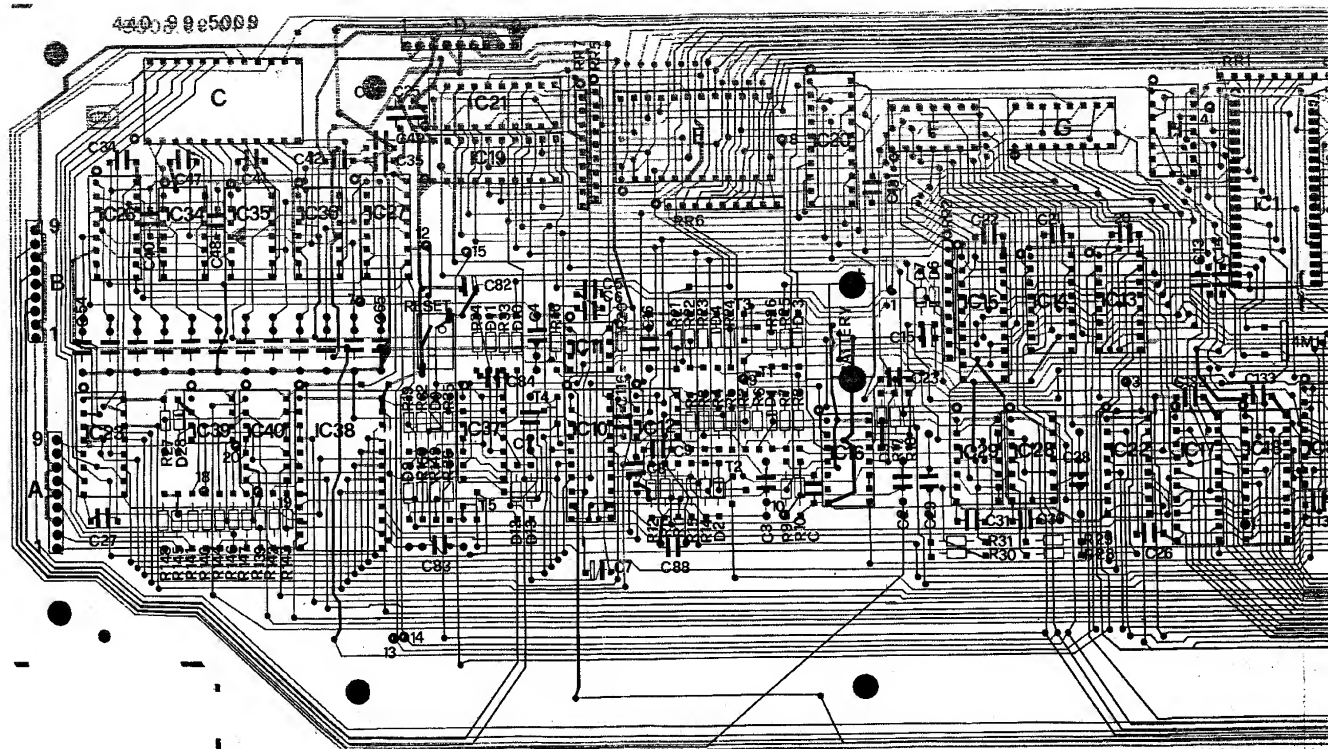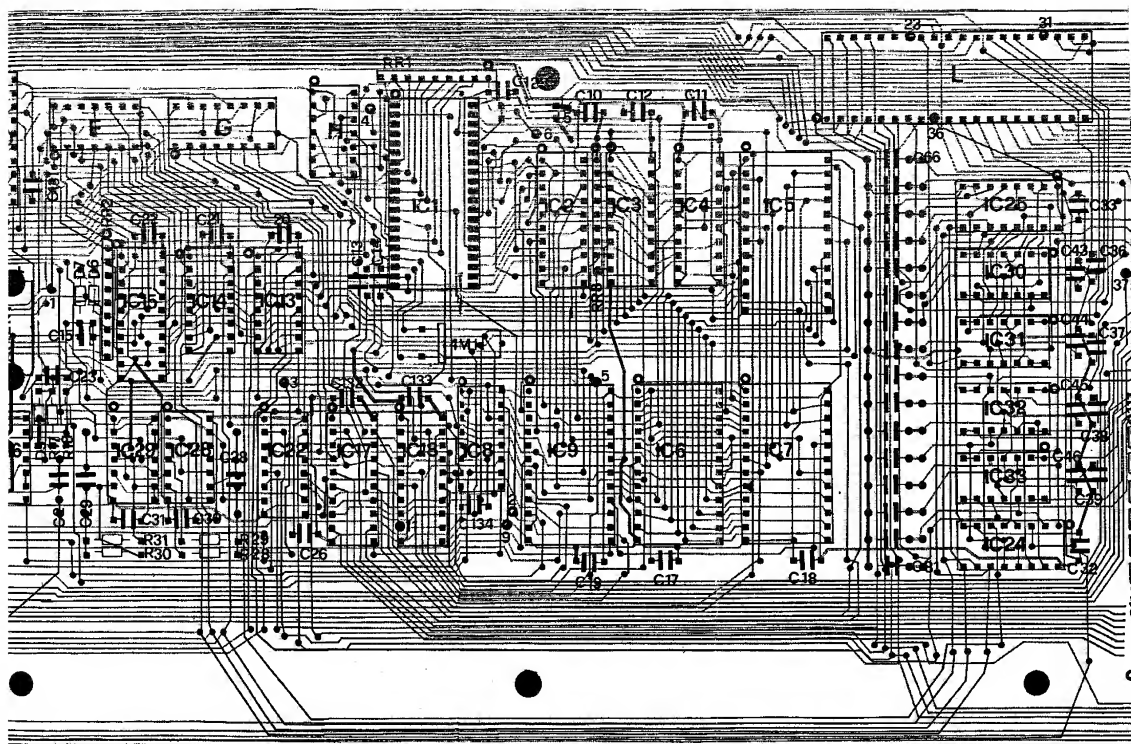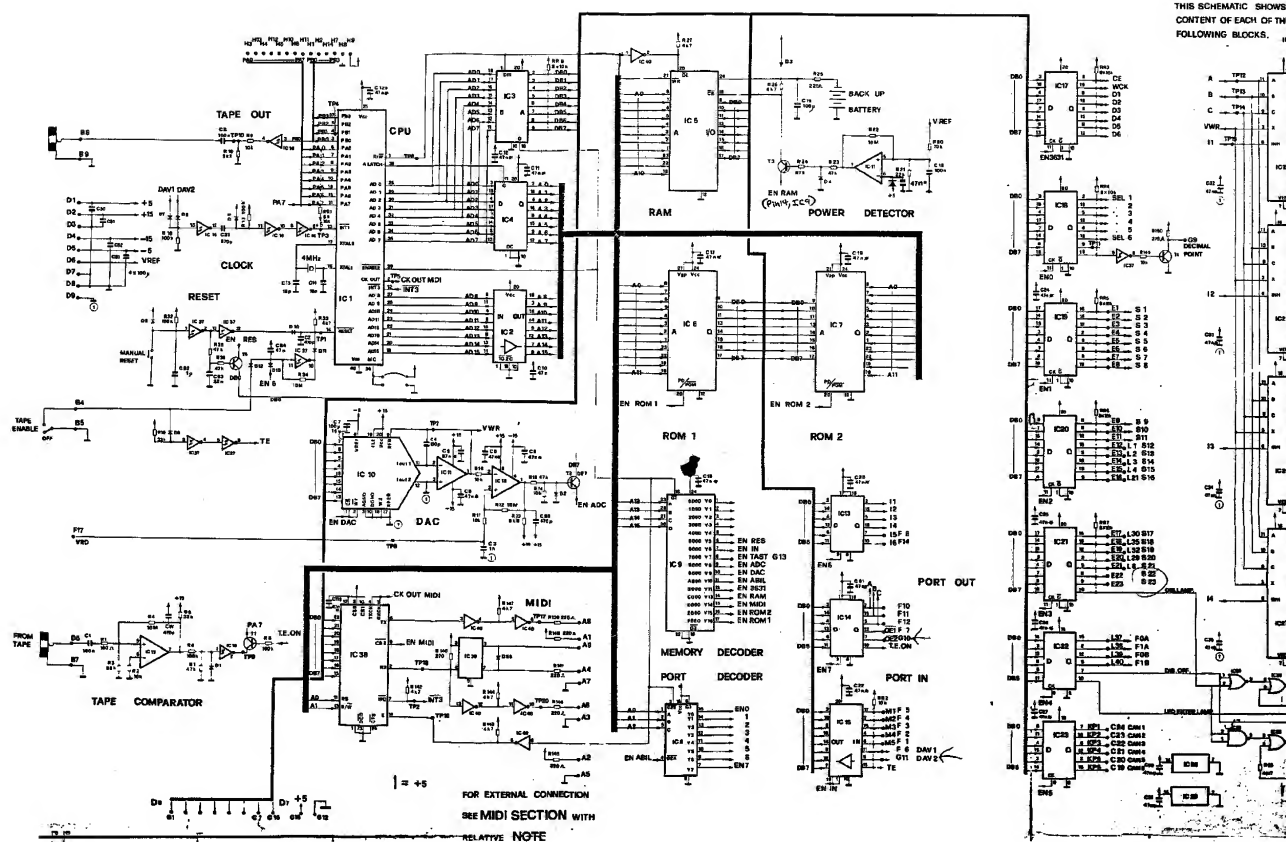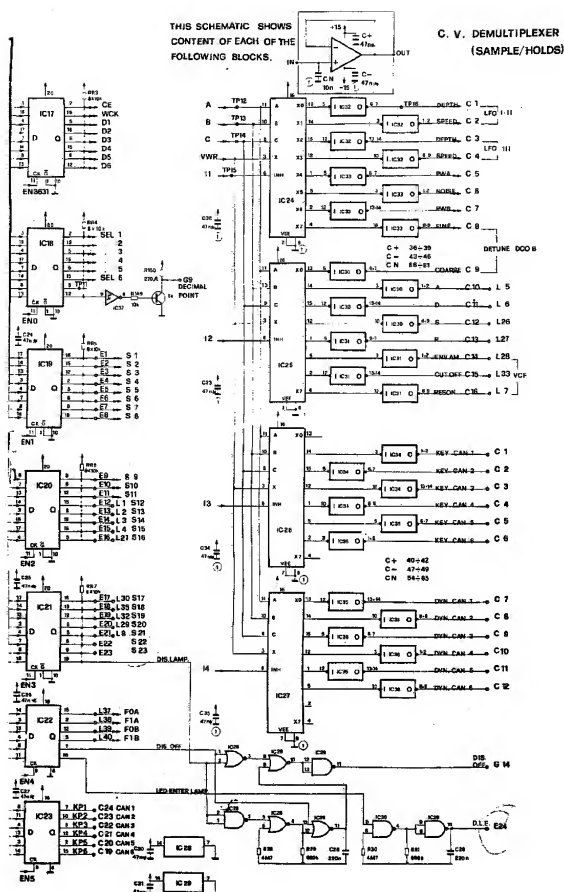
VOICE 6

THIS SCHEMATIC SHOWS CONTENT OF EACH OF THE FOLLOWING BLOCKS.

C. V. DEMULTIPLEXER (SAMPLE/HOLDS)

C.P.U. BOARD		
I C 1	TMS 7000	367.99.4904
I C 2-15	74LS244	367.99.6510
I C 3	74LS245	367.99.6507
I C 4	74LS373	367.99.6508
I C 5	6116	367.99.4003
I C 6-7	2532	367.99.4402
I C 8	74LS138	367.99.6504
I C 9	74LS154	367.99.6503
I C 10	DAC0831	367.99.7022
I C 11	TL082	367.99.7009
I C 12	LM393	367.99.7011
I C 13-14-22 23	74C174	367.99.6034
I C 16-37	40166	367.99.6029
I C 17;21	74LS377	367.99.6509
I C 24;27 59-61	4051	367.99.6013
I C 28	4051	367.99.6007
I C 29-44;46	4011	367.99.6002
I C 30;36 49-53-58 65	TL084	367.99.7021
I C 38	68350	367.99.5024
I C 39	6N138	367.99.9501
I C 40	SN 7406	367.99.6301
I C 41;43	4081	367.99.6006
I C 47-48	RI104	367.99.5021
I C 50-54-57	4016	367.99.6004
I C 51-67	3080	367.99.7006
I C 52	4053	367.99.6051
I C 55-56	13700	367.99.7005
I C 60-62	4615	367.99.6003